

# Effect of urbanization on hydro-geochemistry and contamination of fracture-karst groundwater from Jiaozuo City, China

S. H. LUO<sup>1</sup>, J. Z. QIAN<sup>2</sup>, J. F. WU<sup>3</sup>, W. D. ZHAO<sup>2</sup> AND K. L. WANG<sup>4</sup>

<sup>1</sup> School of Resources and Environment, Henan Polytechnic University, Jiaozuo 454000, China. luosh@hpu.edu.cn

<sup>2</sup> School of Natural Resources and Environmental Engineering, Hefei University of Technology, Hefei, China 230009. qjz\_mail@yahoo.com.cn

<sup>3</sup> Department of Earth Sciences, Nanjing University. jfwu@nju.edu.cn

<sup>4</sup> School of Civil Engineering, Henan Polytechnic University, Jiaozuo 454000, China. wangkl@hpu.edu.cn

Jiaozuo city located in the central part of China has grown and urbanized rapidly. The city depends heavily on fracture-karst groundwater as a water resource. Because of ubiquitous pollution sources, the quality and contamination have become important issues for the urban groundwater supply. Attempts are made to study effect of anthropogenic pollution and to protect well groundwater resources. This study has investigated the chemical characteristics and the contamination of groundwater in relation to urbanization. The characteristics of chemical component of fracture-karst groundwater are analyzed, summed and classified. Groundwater samples collected at 38 locations in Jiaozuo city show very variable chemical composition of groundwater, e.g. the concentration of  $\text{Cl}^-$  ranges from 8.57mg/L to 128.73mg/L, the concentration of  $\text{SO}_4^{2-}$  ranges from 14.48mg/L to 300.46 mg/L. The water chemical types show groundwater chemistry is more influenced by urbanization than by aquifer rock type. Most groundwater is of  $\text{Ca-HCO}_3$  type, whereas the chemical composition of groundwater from the old downtown and new industrial district is shifted towards a  $\text{Ca-Cl} \cdot \text{SO}_4$  type. The results of factor analysis show the factors affecting the quality of fracture-karst groundwater are mainly anthropogenic pollution and natural weathering reactions. The factors must be considered in making a plan for the rational exploitation, scientific management and protection of resources in Jiaozuo city.

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